Remarks

Applicants request reconsideration and allowance in view of the above amendment and the following remarks.

The office action mailed April 25, 2003 included objections to certain limitations in the amended and new claims. Those limitations are removed by this amendment and thereby overcome the objection to the specification and the rejection of the claims.

A number of claims are cancelled to reduce the issues for reconsideration.

This amendment incorporates the subject matter of original claim 31 into claim 21 and cancels claim 31. As such, claim 21 (twice amended) raises no new issues.

Claim 40 is amended to remove the limitation "undoped" and this raises no new issues.

The limitation "substantially coplanar" remains in claims 21 and 41. The limitation is not indefinite. The vertical depth of a diffusion is related to the selected level of the conductive material in the gate. That is a clear relationship. The same limitation appears in Applicants issued patent US 6351009. The use of the term "substantially" is accepted as definite by the MPEP. See Section 2173.05(h)D. A search of the USPTO database for patents that mention "semiconductor" and have the limitiation "substantially" in the claims revealed over 62,000 references. Applicants submit that the term "substantially" is well understood and is broadly accepted by the USPTO as a definite claim limitation.

The independent claims are rejected based on the combination of Harada and Okabe. The rejection is erroneous because Harada cannot be combined with Okabe without violating the express teachings of Harada who teaches depositing a doped insulating layer into the trench and diffusing the dopants from the insulating layer into the substrate. Harada is very clear that the doped insulating layer must be the source of the dopants because only with a doped insulating layer can Harada achieve the objective of source regions (third semiconductor layer) that are uniform in the direction of current pass. In other words, Harada requires that the maximum doping be at the vertical wall of the trench and decrease laterally outward.

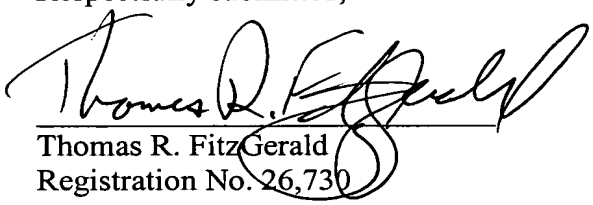
Okabe discloses conventional ion implanting into the surface of the substrate. If one substitutes Okabe into Harada, the results would be a conventional source whose

doping would be non-uniform in the direction of the current pass, i. e., vertically along the walls of the trench.

Claims 21 and 40 are patentable over the combination of references because neither Harada nor Okabe shows or suggests setting the depth of the source regions at about the same level with the conductive gate material in the trench. With reference to Fig. 16 of Harada, it shows that the dopant source 15 for the source regions 5 is on top of the gate material. As such, the N+ diffusion from source 15 will extend below the level of the gate material as is shown in Fig. 16 of Harada. The source regions in Harada are not substantially coplanar with the level of conductive gate material in the trenches.

Having thus distinguished the invention from the art of record, a notice of allowance is respectfully requested.

Respectfully submitted,



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